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## SOCIO - ECONOMIC IMPLICATIONS OF PURSE SEINE OPERATIONS IN KARNATAKA\*

The total marine fish production in India rose from about 0.9 million tonnes in 1969 to about 1.4 million tonnes in 1978. One of the major reasons for the increase in production is the mechanisation of fishing operations. If this trend continues fish production is expected to make further forward strides. This significant increase in fish landings no doubt is a healthy advancement as it enhances productivity and income, promotes development of infrastructure facilities in several areas and above all provides additional quantum of much-needed protein-rich food for the growing population. However, as in the case of many other sectors, mechanisation could seriously affect the employment status and income of artisanal fishermen living in the villages who depend solely on indigenous crafts and gears and their problems are to be looked into from the point of view of social justice.

About 1.4 million marine fishermen population live in about 2000 fishing villages spread over the entire coastline of the country. They mostly operate in the inshore waters. While some of them have taken to mechanised fishing a large number of them are still continuing the traditional methods of fishing. Unable to compete with mechanised fishing it is very likely that many of them may get thrown out of their gainful employment in the course of time thus seriously affecting their economic and social conditions. Considering the importance of the problem, the Central Marine Fisheries Research Institute (C.M.F.R.I.) has initiated a series of studies to assess the impact of mechanisation on the traditional fishermen. The present article is the result of one such study.

One of the traditional gears which has splendid catching power is the Rampani. A large number of fishermen in the Karnataka coast had been actively engaged in Rampani fishing. But with the large-scale introduction of commercial purse seines it is felt

that the fish catch from Rampani has been fast dwindling which is likely to create serious hardship to the fishermen families. The present account deals with the findings of an investigation to study the socio-economic consequence on Rampani fishermen due to commercial purse seine operations in the Karnataka waters. The article incorporates some of the results of an earlier study (Dharmaraja and Jacob, MS) and the information obtained from a special survey in the Karnataka coastal villages recently conducted by a team of scientists of C.M.F.R.I.

### Fishery structure in Karnataka coast

Karnataka State lies on the west coast of India and has a coastline of about 270 km. There are 145 marine fishing villages distributed in the two coastal districts of South Kanara and North Kanara with about 95 landing centres. There are about a lakh of fishermen population in the coastal villages, 22 per cent of whom are active fishermen.

The fishing season begins by about September and extends upto May. The important fisheries in the area are oil sardine, mackerel, cat fishes, sciaenids, seer fish and penaeid prawns. The fish landings have been steadily increasing through the years. There was a sharp increase of fish catch in 1978 compared to 1977 and previous years which is mainly due to the significant increase in the number of purse seine operations.

The types of crafts commonly used by the artisanal fishermen are Rampani boats, dug-out canoes, canoe-type boats and out-rigger boats. The gears used are the Rampani, small shore seine, boat seine, gill net, drift net, cast net and hooks and lines.

By far the most important among the indigenous gears is the Rampani which used to account for about 60 per cent of the total fish caught. Historically the gear has been in operation since the later part of the nineteenth century and it is believed to have been introduced by Fr. Rampani, a Portuguese priest. There were about 160 units operating in the Karnataka

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coast in 1976. Rampani is a shore seine of exceptionally large size and consists of 150 to 200 pieces laced together, each piece measuring about 10 to 12 m long. The breadth varies from 2 to 7 m and it is narrower at the extremities. The head rope is buoyed with wooden or plastic floats and the foot rope weighted with stones or metal balls at regular intervals. The net requires about 80 to 100 persons for operation. When a shoal of fish is sighted near the shore one end of the net is held at the shore by a group of fishermen and the Rampani boat is steered in a semi circular path releasing the net and the boat brings back the other end of the net to the shore encircling the shoal. The net is slowly dragged bringing the catch ashore or is kept impounded and fish caught in stages depending upon the market trend.

The mechanised crafts prevalent in Karnataka are the trawlers and the purse seiners. The trawler catches are mostly penaeid prawns while the purse seiner catches shoaling fishes and the latter only is relevant to the present investigation.

About two decades ago some pioneering work in purse seining was initiated under the Indo-Norwegian Project. But commercial purse seining started only in 1977 with the introduction of about 120 purse seiners in the Karnataka coast. The number is steadily increasing and is expected to touch the level of 250 by the end of 1979. The purse seine, as is well known, is an encircling gear. As soon as a shoal of fish is located, the net from the mechanised vessel is quickly released to form a wall of webbing around the shoal. The bottom of the net is then pulled together to hold the catch in an artificial pond of webbing which is gradually made smaller and finally drawn aboard. The catch is often transported to the shore through carrier boats. About 26 persons are employed in a purse seiner.

It may be observed that mackerel and oil sardines accounted for the major catch of purse seine as well as Rampani. The area of operation is apparently different, the purse seine moves into the sea but the Rampani is shore based. However the incoming shoals are encircled by the purse seine which results in preventing them from moving towards the shore. Thus the two gears are actually competitive and the more versatile among the two namely, the purse seines, get the upper hand and this could result in substantial depletion in the Rampani catch. It is in this background that the present investigation gets its importance.

## Fish production

The total marine fish landings in Karnataka State was estimated at about 97,000 tonnes in 1977, 153,000 in 1978 and 48,000 in the first half of 1979. The percentage contributions of purse seine and Rampani to the total are shown in Table 1. Figures for the first half of 1978 are given in the last column for purpose of comparison. As seen, South Kanara accounted for bulk of the marine fish catch in the State. The percentage contributions from purse seines in South Kanara out of the State total were 23, 55 and 29 for 1977, 1978, and 1st half of 1979 respectively. The corresponding contributions from Rampani were 23, 7 and 0.2 per cents. In the first half of 1978, 30 per cent landings were from purse seine and 8 per cent from Rampani. Thus it is clear that while the purse seine catches have been increasing, the catches from Rampani have been steeply decreasing. While the overall trend has some similarity in North Kanara, the percentage contribution from Rampani has not shown any considerable decline over the years 1977 to 1979. The reason for the same is that the number of purse seiners operating in the North Kanara district has been ranging only from 3 to 20 during the period while in South Kanara it has been ranging from 120 to 200. Regarding other gears it is seen that there is no definite trend in the catch figures over the years.

Table 1. *Percentage contribution of fish landings by purse seine and Rampani gears for the years 1977 to 1979.*

District	Gear	Years			
		1977	1978	1st half of 1979	1st half of 1978
South Kanara	Purse seine	23.3	54.8	29.3	30.0
	Rampani	23.4	6.8	0.2	7.6
	Other gears	24.1	19.3	26.2	36.8
	TOTAL	70.8	80.9	55.7	74.4
North Kanara	Purse seine	1.2	1.5	14.2	1.7
	Rampani	6.1	4.6	4.7	4.7
	Other gears	21.9	13.0	25.4	19.2
	TOTAL	29.2	19.1	44.3	25.6
South Kanara and North Kanara		All gears	100.0	100.0	100.0

The total fish caught by purse seine and Rampani put together in South Kanara was estimated at about 45,000, 94,000 and 14,000 tonnes respectively in 1977, 1978 and 1st half of 1979. Species-wise percentage

**Table 2.** *Percentage contribution of oil sardine and mackerel landed by purse seine and Rampani gears for the years 1977 to 1979.*

District	Gear	Species	Years			
			1977	1978	1st half of 1979	1st half of 1978
South Kanara	Purse seine	Oil sardine	19.5	44.2	31.9	54.4
		Mackerel	27.5	33.9	43.1	11.7
		Others	2.9	10.9	24.2	13.6
		TOTAL	49.9	89.0	99.2	79.7
	Rampani	Oil sardine	37.7	1.1	0.0	1.5
		Mackerel	5.9	8.1	0.4	14.5
		Others	6.5	1.8	0.4	4.3
		TOTAL	50.1	11.0	0.8	20.3
	TOTAL	All species	100.0	100.0	100.0	100.0
North Kanara	Purse seine	Oil sardines	3.3	4.1	52.8	1.4
		Mackerel	13.0	7.7	4.7	—
		Others	0.1	12.5	17.7	24.9
		TOTAL	16.4	24.3	75.2	26.3
	Rampani	Oil sardines	31.1	24.5	0.1	62.9
		Mackerel	46.4	47.7	22.9	7.6
		Others	6.1	3.5	1.8	3.2
		TOTAL	83.6	75.7	24.8	73.7
	TOTAL	All species	100.0	100.0	100.0	100.0

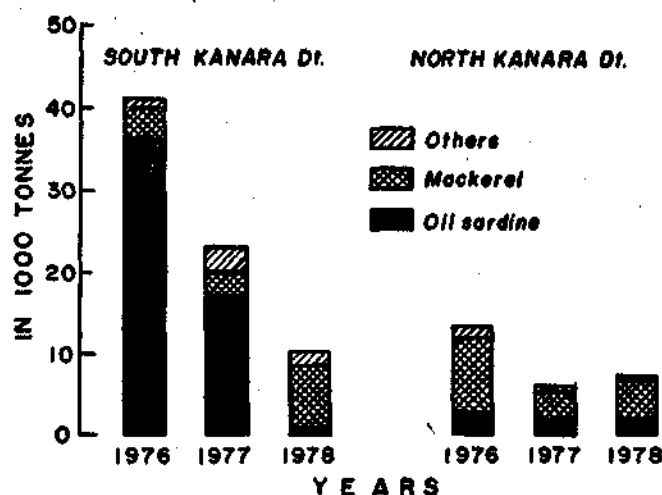
contributions of fish landed by the two gears are shown in Table 2. In South Kanara the total catch was evenly shared between purse seine and Rampani in 1977. But the contribution from purse seine increased to 89 per cent in 1978 and 99 per cent in the first half of 1979. It was 80 per cent in the first half of 1978. Over 75 per cent of the catch was shared by mackerel and oil sardines in most of the cases. This is true for purse seine as well as Rampani. This shows the competitive nature of the two gears. It is seen from table 2 that generally when the proportion of mackerel caught by purse seines is higher than that of oil sardine the proportion of oil sardine caught is higher than that of mackerel in the case of Rampani. This incidentally may imply a reverse distribution pattern in the composition of catch in purse seine and in Rampani. The observation however needs further detailed examination before one could arrive at any conclusion.

In North Kanara, the total fish caught by purse seine and Rampani together is estimated at about 70,000, 9,000 and 9,000 tonnes in 1977, 1978 and first

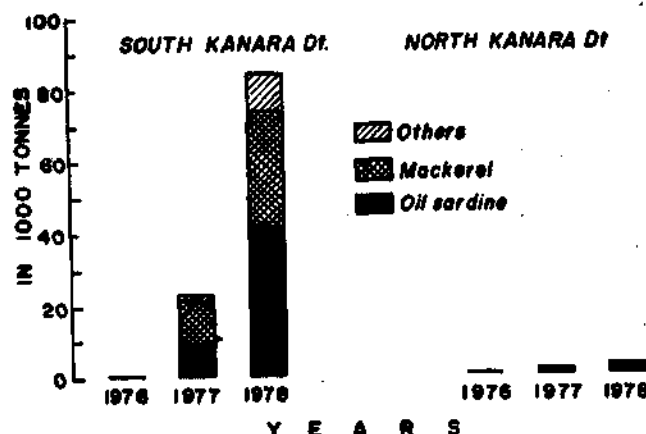
half of 1979 respectively. The Rampani catches were above 76 per cent in 1977 and 1978, but showed a reduced level in the first half of 1979. The purse seine catches showed a general increase. But the trend is not as dominant as observed in South Kanara. It may be stated that the reverse distribution pattern in the composition of catch in purse seine and Rampani observed in South Kanara is also seen in North Kanara for 1979 in which year the tempo of purse seine operations started picking up there.

Fig. 1 shows the catch in tonnes of oil sardine and mackerel from Rampani in South Kanara and North Kanara districts during 1976 to 1978 and Fig. 2 shows that of purse seine.

Information collected on effort expended showed that the number of operations of purse seiners in South Kanara area increased during the period 1977



**Fig. 1.** The catch in tonnes of oil sardine and mackerel from Rampani



**Fig. 2.** The catch in tonnes of oil sardine and mackerel from purse seine

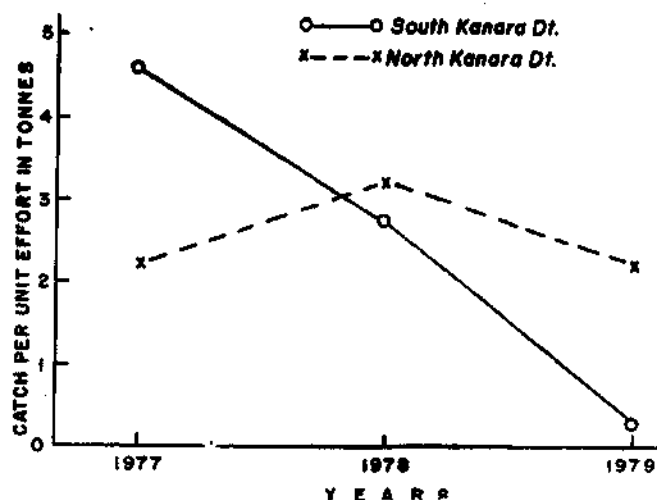


Fig. 3. Catch per unit of effort from Rampani in South and North Kanara District.

to 1979 while that of Rampani steadily decreased. In North Kanara too the number of operations of purse seines increased but the number of Rampani operations remained more or less stationary.

The catch per unit effort in the case of Rampani gear decreased from 4.5 tonnes in 1977 to 0.3 tonnes in 1979 (Fig. 3). In North Kanara on the other hand the C.P.U.E. showed fluctuations and no regular trend was observed.

#### Income and employment

Information on the number of Rampani nets operated now and earlier years, the frequency of operations and income was gathered for about 30 villages in South and North Kanara districts from fishermen and officials of the Department of Fisheries, Karnataka State.

The data showed that the number of Rampani nets operating in South Kanara was about 75 in 1977, 60 in 1978 and only 30 in 1979 resulting in a reduction of about 60 per cent in 1979 as compared to 1977. The number of purse seines on the other hand increased from about 120 to 200. It was also learnt that the number of operations of Rampani gear has reduced from about one per day to one or two in a week during the season. The catch per Rampani per year has reduced to about one eighth in value compared to 1977.

In North Kanara about 72 Rampani nets were in operation in 1977. There is only a marginal reduction in Rampani operations in 1979. The number of purse seines increased from 3 in 1977 to about 20 in

1979. While the catch from Rampani has been slightly decreasing there has been no appreciable change in the number of operations nor in the income from Rampani unit. The main reason for this difference in North Kanara compared to South Kanara is that the bulk of the total number of purse seiners operate in the South Kanara coast. However with the increased activities of purse seiners there can develop a similar situation in North Kanara also.

In addition to the above surveys, case studies were also undertaken in two villages in South Kanara namely Sasihithlu and Kuthupadi. It was observed that about 14 per cent of the fishermen actively engaged in Rampani operation were thrown out of employment during 1978-79 compared to 1976-77. The income from Rampani during 1978-79 had reduced substantially amounting to about Rs. 500 per year. The adverse effect of the introduction of purse seines on the economic condition of the Rampani fishermen was explicitly visible in these villages.

The value of the fish caught by purse-seines and Rampani was estimated by utilising the information on marine fish landings over the years and price of fish at the landing centres (1979 price) obtained through the large-scale statistically designed probability sampling scheme continuously being operated by the Central Marine Fisheries Research Institute. The estimated values of the product are given in Table 3. It can be seen that in South Kanara district the revenue from purse seines increased from about Rs. 266.2 lakhs in 1977 to Rs. 893.6 lakhs in 1978. Compared to the first half of 1978 when the value of fish caught was about Rs. 151.4 lakhs, in the 1st half of 1979 the amount was Rs. 195.9 lakhs. On the other hand the revenue of Rampani owners decreased from about Rs. 290.0 lakhs in 1977 to 145.5 lakhs in 1978. Compared to the value of about Rs. 78.8 lakhs in the 1st half of 1978, in the corresponding period of 1979 the amount was only Rs. 3.9 lakhs indicating a serious set back to the Rampani owners.

Table 3. Value of fish (in lakh Rs.) landed by purse seine and Rampani gears for the years 1977 to 1979 (1st half)

District	Gear	Years			
		1977	1978	1st half of 1979	1st half of 1978
South Kanara	Purse seine	266.21	893.57	195.89	151.36
	Rampani	199.69	145.52	3.92	78.76
North Kanara	Purse seine	15.76	26.21	75.41	15.24
	Rampani	85.00	87.62	39.85	22.26



Hauling of a *rampant*



Brailing mackerel catch on board purse seiner (Mangalore)



Release of purse seine (Mangalore)



Carrier boat with oil sardine (Mangalore)



Brail of mackerel being emptied on board purse seine (Mangalore)



Auctioning of purse seine catch at Malpe



In North Kanara also the revenue from purse seines had been increasing. The receipts from Rampani operations did not show any decline. This, as stated earlier, is due to the much smaller number of purse seines in operation on the North Kanara coast compared to South Kanara.

The average annual revenue received by a Rampani group in South Kanara worked out to about Rs. 2.7 lakhs in 1977 which reduced to Rs. 13,000 in the first half of 1979. In North Kanara district the revenue of a Rampani group remained more or less steady during the period 1977 to 1979.

It is felt that it would be useful to know the economics of Rampani operations in order to have a better appreciation of the income received by the fishermen. The cost of a Rampani unit and the maintenance expenditure are shown in Table 4.

Taking 80 as the number of persons engaged in a Rampani unit and considering 300 working days in an year, a unit should yield a revenue of Rs. 2.4

**Table 4. Cost and maintenance expenditure of a Rampani unit (Rs.)**

Item	Cost	Maintenance
Net	1,25,000	—
Boats and other accessories	30,000	—
Net (10% of the net)	—	12,500
Boat (5% of the boat)	—	1,500
Interest (12½%)	—	19,400
Depreciation (10%)	—	15,500
<b>TOTAL</b>	<b>1,55,000</b>	<b>48,900</b>

lakhs if a person is to get Rs. 10/-per day of work. This is excluding the cost of maintenance of a unit. Adding the maintenance cost of about Rs. 49,000, the total revenue of a Rampani unit should be around Rs. 2.9 lakhs to enable a minimum level of living for the fishermen. But the actual figure for South Kanara district as already stated, works out to be Rs. 2.7 lakhs per Rampani group in 1977 which slumped to about Rs. 13,000 in the first half of 1979. Thus the Rampani group as it stands today is a heavily loosing concern. This of course has not taken into account the ancillary items of work such as carrying fish to the market place, sales etc., often done by the other family members of the Rampani fishermen.

But this income would be only meagre as the production has crashed. The position in North Kanara has not taken such a serious turn so far.

The per capita annual revenue of a Rampani fisherman in South Kanara worked out to about Rs. 3,370 in 1977 while it is expected to be between Rs. 300 and Rs. 400 in 1979 thus showing only an income of about one eighth compared to 1977.

Considering the employment pattern, in 1977 with about 75 Rampani units in South Kanara, the number of persons directly employed in the operations worked out to about 6,000. Today with 30 Rampani the number of persons employed works out to 2,400. As a result of Governmental measures about 23 Rampani units have been provided with purse seines which can absorb 600 persons on a full-time basis. But the system proposed is that, out of the 80 persons in a Rampani group one third will go in turn in a purse seine. Thus about 1,840 persons earlier employed



Mini truck loaded with mackerel at Malpe

full time in Rampani get part-time work in purse-seines. In addition it is estimated that about 600 Rampani workers have joined the purse seine operations as wage earners. The total number employed out of the original 6,000 would be therefore about 4,840. Thus 1,160 persons are estimated to have been thrown out of job. But it is to be stressed that bulk of the persons out of 4,840 would be heavily under-employed as the number of Rampani operations as well as catch per effort has considerably reduced. In North Kanara no noticeable change in employment pattern has been observed.

## Discussion

A perusal of the gearwise estimates of marine fish landings in the Karnataka coast shows that the landings from purseseines have been steadily increasing during the years 1977 to 1979 (1st half). This is particularly so in the South Kanara district. The sharp increase in landings by purseseine have boosted the total landings of the State and the income from the fishery sector has considerably increased.

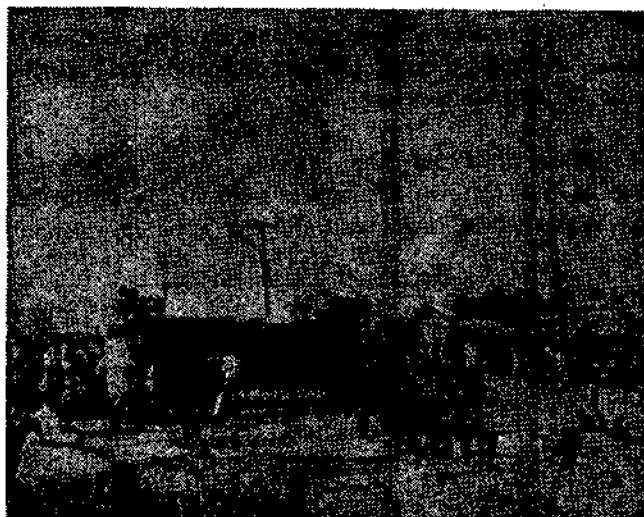
At the same time the marine fish landings from the traditional Rampani gear have shown a steep decline during the period, South Kanara being the worst hit. The number of Rampani units in operation reduced from about 75 in 1977 to 30 in 1979. The catch per unit effort declined from about 4.5 tonnes in 1977 to 0.3 tonnes in 1979. Out of the estimated 6,000 persons actually engaged in Rampani operations in 1977, about 1,160 are estimated to be completely thrown out of their jobs. Even those who stick on to Rampani operations are mostly underemployed. The income in 1979 from a Rampani unit has been estimated to be only about one eighth of the income obtained in 1977. Despite considerable erosion in income the middle aged and older persons continue in the villages mainly because of their reluctance to leave their traditional way of life. The non-availability of alternative employment opportunities in the village is another factor which compel them to stick on to Rampani operations. Obviously most of them are underemployed and some of them come under the category of disguised unemployment. The situation in North Kanara has not so far taken such an adverse turn, the reason being that the bulk of the purseseine activities are around the South Kanara coast.

No doubt, the increased number of purseseine operations and the consequent heavy fish catches would generate employment, help in the development of supporting industries like ice manufacturing, boat building etc., and provide additional protein-rich food to the people. But the employment generated is mostly for a category of persons around the important landing centres like Mangalore, Malpe, Ganguli and Bhatkal and may not have a direct bearing to the unemployed and the under-employed Rampani operators living in far flung villages. As such the problems facing the Rampani fishermen and their families need serious consideration.

The Government and other developmental agencies are seized of the problem and several relief measures are

under way. The Government of Karnataka is helping the Rampani groups to get loans on liberal terms to purchase purseseines. They are giving more subsidy and more margin money and levying lower interest rate. Financing agencies have been instructed to give all preferences to Rampani fishermen with a view to prevent the Rampani operators from going astray and to provide them with employment. However it is but natural that this facility is likely to be cornered mostly by the more enterprising fishermen and the benefits may not percolate down to those who are conservative and who are hesitant to move out of their traditional homelands. Moreover it may not be possible to secure employment in purseseiners to all the affected as they very much outnumber the total strength required for purseseine operations.

The following suggestions may be useful for the speedy rehabilitation of the affected Rampani fishermen.



Loading of oil sardine at Bundur, Mangalore for oil extraction

First is the enforcement of the area of operation of the purseseines and Rampani nets. The Karnataka Government has issued orders prohibiting purseseines operating within 8 km from the coast. But unless legislation is passed to this effect it would be very difficult to bring to book the erring purseseine operators. Registration of boats must also be made compulsory which can help in identifying the boats. Moreover the policing organisation may need strengthening with enough patrol boats having modern equipments so as to move in the extensive area where fishing operations take place and to effectively communicate.

Secondly sufficient extension work may have to be carried out for making intensive efforts to persuade



more fishermen to take to purse seine operations and associated ancillary activities keeping in view the constraints dictated by biological and economic factors.

Thirdly some of the affected fishermen could be induced to take up mariculture work in areas in the

villages which are suitable for the purpose. Loans may have to be advanced by banks and other financing agencies to the fishermen for taking up such work. Feasible and economically viable mariculture programmes would provide gainful alternative employment to a large number of these fishermen.

